

## Considerations in the Development of Dose-Response Functions for Particulate Matter

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Air pollution and particulate matter (PM) are complex mixtures that have been associated with various health studies. A majority, but not all, of these studies have reported significant associations between various measures of particulate matter and health. There are principally two types of studies that have been undertaken to study this issue: times series studies and cohort (cross-sectional) studies. These studies have different designs and limitations, and they may indicate different health outcomes. The differences and implications of these two study designs will be compared. Within each type of study there is a wide variety of outcomes; indeed within a given study, results can differ significantly. This poses difficulties for the development and choice of a damage function. There is no way that one specific damage function can characterize the panoply of results available. In addition several studies have suggested that all components of the PM mixture are not equally toxic. In an epidemiological setting, however, air quality has generally not been sufficiently well-characterized to identify many of those components that may be associated with a particular health endpoint. This paper presents results of a recent effort to relate various health endpoints to specific components of PM. These results suggest that dose-response functions should attempt to address the specific components of PM as part of their analyses as well. Indeed the challenge in the development of dose-response functions is to develop a function or set of functions that reflect both scientific knowledge and current uncertainties.

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